(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 913 532 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
06.05.1999 Bulletin 1999/18

(51) Int. Cl.[6]: **E03D 1/14, E03D 1/30**

(21) Application number: **98120399.5**

(22) Date of filing: **28.10.1998**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **03.11.1997 IT TO970964**

(71) Applicant: **Oliveira & Irmao S.A.**
3800 Aveiro (PT)

(72) Inventor:
Moura de Oliveira, Antonio Manuel
3800 Aveiro (PT)

(74) Representative:
Cerbaro, Elena et al
STUDIO TORTA S.r.l.,
Via Viotti, 9
10121 Torino (IT)

(54) Improvements to a device for controlling the water discharge valve of a cistern for sanitary apparatus

(57) The device (8) comprises a closure element (31) for the valve (31, 32), carried by a first float (29, 33), a member (82) operable for a predetermined stroke to raise the first float (29, 33), and a second float (41) concentric with the first float (29, 33) and having an hydrostatic thrust greater than the weight of the first float (29, 33). The second float (41) is normally held against rising by a hook (59) for controlling the partial emptying of the cistern (5), and is released to slow down the return to rest of the first float (29, 33), acting on the member (82) with a greater stroke. The member (82) is mounted on a cup-like connector (81) fixed in a hole (87) in a cover (88) of the cistern (5), while the valve (31, 32) is fixed to a base wall (6) of the cistern (5). A flange (129), carried by a hollow body (114) coaxial with the valve (31, 32), is engaged by the member (82) coaxial with the connector (81) to compensate for misalignment between the hole (87) and the valve (31, 32).

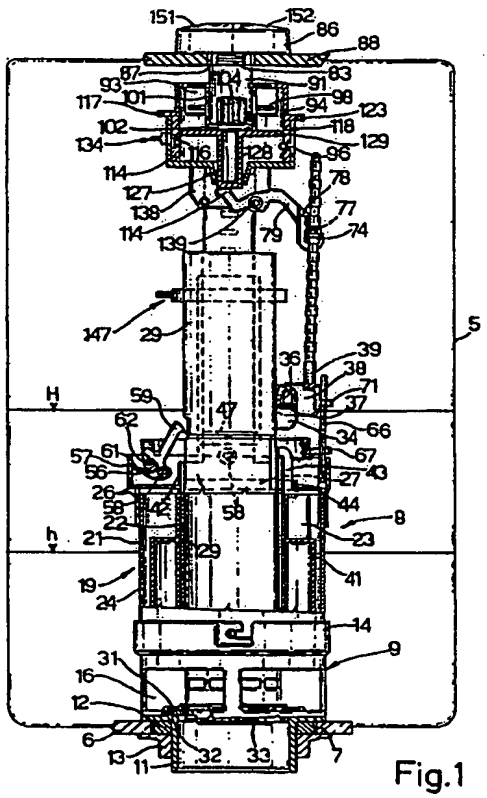

Fig.1

EP 0 913 532 A2

Printed by Xerox (UK) Business Services
2.16.7/3.6

Description

[0001] The present invention concerns improvements to a device for controlling the water discharge valve of a cistern for sanitary apparatus. In particular, the invention concerns improvements to a control device which enables the total emptying or a partial emptying of the cistern.

[0002] In discharge valve control devices, it is usually necessary to control the closure of the valve in such a way as to enable the total emptying of the cistern. In these devices, the closure of the valve is slowed down by various arrangements that utilise the suction of the emptying.

[0003] A control device is known in which the discharge tube of the outflow carries an annular element for closing the discharge valve, which enables the discharge of the outflow through the tube and the annular element. Furthermore, the discharge tube acts as an annular float, and is raised by operating a first push button to control the partial emptying of the water from the cistern. A second float concentric with the discharge tube, and having a hydrostatic thrust greater than the weight of the discharge tube, is usually prevented from moving up by a hook on the second float. This is released by operating a second push button to slow down the closure of the valve until the water level falls below the second float, so that the cistern empties completely.

[0004] The operation of this hook is effected by a separate kinematic mechanism, which means that the control device is relatively complicated and expensive. Furthermore, in the case of total emptying, the associated kinematic mechanism must simultaneously raise the discharge tube as well, which requires a greater force. Finally, the known device requires the perfect alignment of the connection of the push buttons with the discharge valve.

[0005] The object of the invention is to provide a control device for the discharge valve of a cistern for sanitary apparatus of the aforesaid type, which is simpler and more reliable to operate, and which has limited manufacturing costs.

[0006] According to the invention, this object is achieved by the control device for the water discharge valve of a cistern for sanitary apparatus, which includes a valve closure element carried on a first float, a control element operable with a predetermined stroke to raise the said first float, and a second float substantially concentric with the said first float and with a hydrostatic thrust greater than the weight of the said first float, the said second float being normally prevented from rising so that it does not affect the return downward of the said first float to control the partial emptying of the said cistern, and being released in order to slow down the return to rest of the said first float, thus controlling the total emptying of the said cistern, and is characterised in that a hook normally secures the said second float and is operable by the said element by an extra stroke beyond the said predetermined stroke so as to release the said second float.

[0007] According to another aspect of the invention, in order to compensate for a situation in which a hole in the bottom wall of the cistern and a hole in the top of the cistern are off-set, the control element is connected to a first sleeve mounted on a cup-like connector fixed in the hole in the top, while the said valve is fixed to the bottom of the cistern, the said element acting via the said first sleeve on a flange concentric with the said hole in the bottom.

[0008] For a better understanding of the invention, a preferred embodiment is described here, given by way of example with reference to the accompanying drawings, in which:

Figure 1 is a view in partial section of a device for controlling the emptying of water from a cistern, according to the invention;
Figure 2 is an exploded perspective view of some parts of the device of Figure 1;
Figure 3 is a partial view of the device, at 90° with respect to Figure 1;
Figure 4 is a median section on an enlarged scale of a portion of Figure 1;
Figure 5 is a perspective view of a detail of Figure 1;
Figure 6 is an exploded section of some parts of Figure 4; and
Figure 7 is an exploded perspective view of a detail of Figure 6.

[0009] With reference to Figure 1, the reference numeral 5 indicates a water cistern for sanitary apparatus, provided with the usual valve for connection to the water supply pipes, and the usual float for controlling this valve, not indicated in the drawings. The cistern 5 also has a base wall 6 with a hole 7 in which a device for controlling the water discharge, generally indicated 8, is mounted. A discharge connector 9 includes a lower, threaded portion 11 inserted in the hole 7 with an interposed gasket 12, and fixed by a threaded nut 13. A portion 14 of the connector 9 has apertures 16 to allow the water to pass through. A support 19, bayonet-fitted to the discharge connector 9, includes an outer wall 21 and an inner wall 22 defining an annular space 23. The outer wall 21 has a hole 24 to enable the slower emptying of the space 23. This space 23 is closed at the top by a releasable cover 26, which is delimited inside by an annular edge 27 having a diameter greater than that of the inner wall 22. The cover 26 has a pair of apertures 28, only one of which is visible in Figure 2, through which the water enters the space 23.

[0010] The usual outflow discharge tube 29 is slidingly guided inside the wall 22, which tube carries a ring 31 (Figure 1) made from elastic material, which rests against a projection 32 of the connector 9. The projection 32 thus defines the seat for the discharge valve of

the cistern 5, which is closed by the ring 31. The tube 29 also carries a disk 33 which enables it to function as a first float for controlling the return of the ring 31 to the closed position of the discharge valve. The disk 33 is moved downwards against the action of a spring, not visible in Figure 1, when the column of water in the tube 29 exceeds a certain maximum design level H for the cistern 5, as described in Italian Patent Application No. TO96A000276 in the name of the same Applicant.

[0011] The discharge tube 29 also has at its upper part an outer radial fin 34 having a vertical slot 36 in which a pin 37 carried on a vertical plate 38 engages. This has a horizontal tab to which a connecting rod 39 is fixed, capable of being moved upwards to raise the tube 29, as will be better seen below.

[0012] A second float is accommodated in the space 23 of the support 19, which float is formed from a casing 41 that is open at its base. The top of the inner wall of the casing 41 extends into a sleeve 42 guided between the wall 22 of the support 19 and the internal ring 27 of the cover 26. The sleeve 42 has an axial rib 43 which engages in a radial recess 44 (see Figure 2 also) in the ring 27 to prevent the rotation of the second float 21 about the discharge tube 29. The float 41, when immersed in the water, has a hydrostatic thrust greater than the weight of the tube 29. The tube 29 has two radial projections 47 (see Figure 3 also) engaged by the upper edge of the sleeve 42.

[0013] The cover 26 is fixed to a pair of diametrically opposed vertical pillars 48 (Figure 2), each having an inner wall 49 and two flanges 51. At the bottom, the flanges 51 of one pillar 48 are connected to the flange 51 of the other pillar 48 by means of a pair of edges 52 and 53. The edge 52 has two portions 54 substantially parallel to the flange 51 of the pillars 48, two portions 56 perpendicular to the portions 54, and a portion 57 for connecting the two portions 56.

[0014] Between the two portions 56 is located a pin 58 (Figure 1) on which is pivoted a hook 59, which is movable in a radial plane with respect to the tube 29 and engages the edge of the sleeve 42 to prevent the upward movement of the second float 41. The hook 59 has a fork 61 which engages a bar 62 carried by a lever, generally indicated 63 (see Figure 5 also).

[0015] In particular, the lever 63 is formed from two symmetrical arcuate portions 64, each pivoted on a corresponding pin 66 (see Figure 2 also) fixed to the corresponding pillar 48. The two portions 64 thus surround the discharge tube 29 and the float 41. The lever 63 is also operable by the connecting rod 39 via a slide 66. To this end, the lever 63 is provided with a peg 67 diametrically opposite the bar 62 and which engages a slot 68 in the slide 66.

[0016] The slide 66 also has a second vertical slot 69 in which another peg 71, fixed to a vertical fin of the plate 38 of the connecting rod 39, engages. At its base, the slot 69 has an enlargement 72 to enable a T-shape head of the peg 71 to pass through. The connecting rod 39 has a series of channels 73 (Figures 1 and 3) disposed in a predetermined manner. A C-shape connector element 74 has a pair of inner projections 76 which snap-engage in one of the channels 73 of the connecting rod 39. In addition, the element 74 has two diametrically opposed pegs 77 in which two hook-shape parallel projections 78, fixed to a return lever 79, engage.

[0017] The control device also includes a cup-like connector 81 (Figures 4 and 6) for supporting a control member for both partial emptying and total emptying of the water from the cistern 5, formed from a push rod 82. The connector 81 has an externally threaded, hollow shank 83. The connector 81 also has a flange 84 which engages a joint-covering ring 86. The shank 83 is inserted in a hole 87 in the usual cover 88 of the cistern 5. The hole 87 may be offset, within certain limits, with respect to the hole 7 (Figure 1) in the base wall 6.

[0018] The shank 83 engages a threaded portion 89 (Figure 2) of a sleeve 91. This has two pairs of guide plates 92 co-operating with two prismatic guides 93, carried by a box-like portion 94 of a support, generally indicated 96. The sleeve 91 also has two diametrically opposed radial projections 97, each of which engages a slot 98 in the respective prismatic guide 93. Furthermore, the sleeve 91 has two radial projections 99, located at 90° with respect to the projections 97, and which engage two slots 100 in two diametrically opposed wings 101 fixed to another sleeve 102 having an inner threaded portion 103 (see Figure 6 also).

[0019] The sleeve 102 has four axial ribs 104 by means of which it is held centred in the sleeve 91. The push rod 82 has a threaded portion 108 in engagement with the threaded portion 103 of the sleeve 102, and has an upper cruciform projection 109. The push rod 82 also has an axial channel 111 which engages a radial projection 112 on the lower edge of the shank 83 in order to prevent it rotating.

[0020] The support 96 has a cylindrical hollow body 114 (Figure 2) with a pair of annular ribs delimiting an arcuate channel 116, and an upper flange 117 for connection with the box 94. The hollow body 114 is rotatably housed in a ring 119 carried by another support 118 connected to the cover 26, as will be seen better below. The flange 117 rests on the edge of the ring 119, the outer surface of which has two axial ribs 121 projecting above the ring 119 to cooperate with a pair of projections 123 of the flange 117 in such a way as to limit the rotation of the support 96 in the ring 119.

[0021] The support 118 also has a horizontal plate 124 provided with a central hole 126. The plate 124 has an integral sleeve 127 (Figure 4) the inner surface of which tapers slightly to house a hollow shank 128 of a flange 129. This is able to move vertically within the hollow body 114 and be engaged by the lower surface of the sleeve 102. The plate 124 is connected to the ring 119 by means of two diametrically opposed segments 131 (Figure 2) intercalated with two flat walls 132 at a tangent to the ring 119. Each wall 132 is connected to

the associated rib 121, and includes a curved portion to form a tangential guide 133.

[0022] The two guides 133 are parallel and specular, and have a semicircular section similar to that of the channel 116. A member 134 for the rapid connection of the supports 96 and 118 has two parallel arms 136 inserted in the two guides 133 and the channel 116 of the hollow body 114, enabling the support 96 to be angularly orientated with respect to the support 118. The member 134 further has a cross member 137 for connecting the two arms 136, which is manually operable to move the member 134, substantially as described in Utility Model Application TO96U000075.

[0023] The plate 124 of the support 118 is also provided with two vertical, parallel tabs 138 (Figures 3 and 4) having two holes in which a pin 139 of the return lever 79 is rotatably housed. The lever has an arm 141 engaged by the shank 128 of the flange 129. In turn, the support 118 has two diametrically opposed toothed bars 142 connected to the plate 124 and the ribs 121. The bars 142 extend downwards and engage between the two flanges 51 of the pillars 48. The bars 142 have a series of teeth 143 having the same spacing as the channels 73 of the connecting rod 39.

[0024] The two flanges 51 of each pillar 48 have two corresponding slots 144 (Figure 2) aligned with each other and of dimensions corresponding to the section of a space between two adjacent teeth 143 of the bars 142. Two bolts 146 of a second rapid connection member 147 are inserted in the two slots 144. This includes a cross piece 148 for connecting the bolts 146, which is manually operable to connect the support 118 with the cylindrical support 19, as described in the Utility Model Application mentioned above.

[0025] The cup-like connector 81 (Figures 6 and 7) houses a pair of push buttons 151, 152 having a complementary shape so as to occupy completely the inner area of the connector 81. The two push buttons 151 and 152 are formed from two curved plates which snap-engage on two corresponding flanges 153 and 154, and have ribs 156 of different shapes so as to be identified by touch upon installation. The two flanges 153 and 154 are fixed to two corresponding, coaxial hollow shanks 157 and 158.

[0026] The shank 83 of the connector 81 has a pair of elements, each formed from an edge 159 projecting into each of two elastic portions 161 and 162 of the shank 83. The portions 161 and 162 are located diametrically opposite the end of the shank 83 adjacent the connector 81, and are each delimited by a C-shape slot 163 of the shank 83. The elastic portions 161, 162 snap-engage the two hollow shanks 157, 158 in such a way as to allow axial movement, while preventing them from coming out of the connector 81.

[0027] In particular, the push button 151 is adapted to operate the push rod 82 for a predetermined stroke, which controls the partial emptying of the cistern 5. The shank 157 of the associated flange 153 has a discharge 164 in which a hook-like elastic projection 166 of a peg 167 engages, which engages the projection 109 of the push rod 82. The peg 167 has a projection 168 at its base and snap-engages below the edge 159 of the elastic portion 161. The flange 153 has a tab 170 which defines the stroke of the push button 151.

[0028] The push button 152 moves the push rod 82 for a stroke greater than that controlled by the push button 151, so as to control the total emptying of the cistern 5. The shank 158 of the associated flange 154 is located outside the shank 157 and has a projection 169 which snap-engages below the edge 159 of the elastic portion 162. The shank 158 has a cut out portion 171 to enable the difference in stroke of the two push buttons 151, 152, and a cut out portion 172 to enable the operation of the push button 151 without affecting the push button 152.

[0029] The control device 8 is mounted at the customer's premises in the following way.

[0030] First of all, the connector 81 is unscrewed from the sleeve 91 (Figure 4) so that the push rod 82 is unscrewed from the sleeve 102 and can be extracted together with the connector 81, the two shanks 157 and 158 and the two push buttons 151, 152. The portion 11 of the connector 9 is then inserted in the hole 7 in the base wall 6, and fixed by the ring 37 with the gasket 12 interposed therebetween. Furthermore, if necessary, the height of the tube 29 can be adjusted by cutting the excess part.

[0031] Then, by extracting the connection member 147 (Figure 2), the distance between the support 118 and the cover 26 is adjusted according to the dimensions of the cistern 5. The bars 142 are now fixed again to the pillars 48 by means of the connection member 147. Now, the connection of the connecting rod 39 (Figures 1 and 3) with the lever 79 is adjusted by inserting the projections 76 of the C-shape element 74 in a channel 73 of the connecting rod 39 corresponding to the position of the bars 142. The rest position of the arm 141 of the lever 79 is a high position, and the arm holds the flange 129 in the high position of Figure 4.

[0032] The connector 81 (Figure 4) is then fitted, together with the push rod 82 and the push buttons 151, 152, into the hole 87 in the cover 88, with the possible interpositioning of the joint-covering ring 86. In fact, the purpose of the ring 86 is primarily aesthetic, and is used when the diameter of the hole 87 is less than that of the connector 81. On the other hand, the ring 86 is omitted whenever the diameter of the hole 87 is such that it can house the connector 81. In this case, the flange 84 of the connector 81 rests directly on the cover 88.

[0033] The support 96 is now orientated with respect to the support 118, and the two sleeves 91 and 102 are moved radially, compensating for the possible misalignment of the hole 87 in the cover 88 with respect to the hole 7 in the base wall 6 of the cistern 5. Then, positioning the cover 88 in its seat on the cistern 5, the shank 83 of the connector 81 is screwed into the threaded portion

89 of the sleeve 91, and the threaded portion 108 of the push rod 82 is screwed into the threaded portion 103 of the sleeve 102. The push rod 82 thus axially moves the sleeve 102 bringing it substantially into contact with the flange 129 (Figure 4).

[0034] The control device 8 for the discharge valve of the cistern 5 operates in the following way.

[0035] At rest, the cistern 5 (Figure 1) is full of water to the level H defined by the usual float for closing the water supply valve. The outflow discharge tube 29 is in the low position of Figure 1, in which the ring 31 rests against the projection 32, so that the discharge valve is closed. The water in the space 23 urges the float 41 upwards, but it is held by the hook 59.

[0036] When the push button 151 (Figures 4 and 6) is pushed, the associated shank 157 acts, by means of the peg 167, on the push rod 82, and causes the slots 100 in the wings 101 to slide on the projections 99, moving the sleeve 102 downwards. The sleeve 102 acts on the flange 129 so that the shank 128 acts on the arm 141, causing the return lever 79 to rotate in an anticlockwise direction by a corresponding amount. The lever 79, via the connecting rod 39 (Figure 1), then raises the discharge tube 29, detaching the ring 31 from the projection 32 to open the discharge valve.

[0037] In turn, the peg 71 moves the slide 66 (Figure 5) upwards, the slot 68 of which slides on the pin 67 of the lever 63. The connecting rod 39 allows lost motion with respect to the slide 66, so that the lever 63 is not rotated and the hook 59 (Figure 1) remains in the position in which it holds the edge of the sleeve 42 of the float 41. The water now starts to flow through the connector 9, creating a hydrostatic thrust on the float comprising the disk 33 and the tube 29, so that this is held in a high position. When the water level in the cistern 5 falls below an intermediate level h, where the hydrostatic thrust on the float 29, 33 equals the weight of this float, the tube 29 descends under gravity, closing the discharge valve.

[0038] On the other hand, pressing the push button 152 (Figures 4 and 6) causes it to perform a greater stroke than the stroke of the push button 151, and acts with its shank 158 on the push rod 82. This, via the sleeve 102, the flange 129, the shank 128 and the lever 79, moves the connecting rod 39 (Figure 1) upwards by a stroke that is greater than in the preceding case, so that the connecting rod 37 performs an extra stroke. The pin 37 moves the discharge tube 29 upwards, opening the discharge valve, substantially as described above, so that the tube 29 is pushed upwards by the hydrostatic thrust.

[0039] But now, the peg 71, after having performed its lost motion with respect to the slide 66 (see Figure 5 also), now rotates the lever 63 in an anticlockwise direction. The bar 62 now turns the hook 59, releasing the edge of the sleeve 42. The float 41, by virtue of the hydrostatic thrust, now moves upwards until it engages the projections 47 of the tube 29 with its upper edge. The hydrostatic thrust acting on the float 41 now carries this latter to rest against the cover 26, and the discharge tube 29 is raised.

[0040] The water now flows out through the discharge, but when the hydrostatic thrust on the tube 29 equals its weight, the tube 29 is still held up by the float 41. Since the hole 24 enables a slow emptying of the space 23, the hydrostatic thrust on the float 41 is maintained by the water in the space 23 even when the level of the water in the cistern 5 falls below the level h. The float 41 ensures the complete emptying of the cistern 5 and then falls, together with the discharge tube 29, until the ring 31 rests again against the projection 32.

[0041] Since the push button 152 is usually released before the float 41 starts to fall, when this happens, the slide 66 returns to its low position, carrying the hook 59 to rest against the sleeve 42. When the float 41 returns to the low position, the hook 59 re-engages the upper edge of the sleeve 42 so that the float 41 is again secured in its low position.

[0042] From the above, the advantages of the control device of the invention over known devices are clear. In particular, the hook 59 mounted on the lever 63 makes the device simpler and more economical. Furthermore, the operating force on the push button 152 for completeemptying is much less, since the hook 59 is operated at the end of the stroke of the push button without having simultaneously to raise the tube 29.

[0043] In turn, the operation of the discharge tube 29 by the flange 129, on which a transversely controllable element 102 acts, allows wide limits of tolerance of possible misalignment of the two holes 7 and 87 in the cistern 5. Finally, the assembly carried by the connector 81 can be mounted together with the push rod 82 without removing this latter from the shank 83.

[0044] It is understood that various modifications and improvements may be introduced to the control device described without by this departing from the ambit of the claims. For example, the lever 63 may be replaced by a different member for transmitting the motion between the connecting rod 39 and the hook 59. Furthermore, the slide 66 may be eliminated, connecting the peg 67 to the connecting rod 39 to obtain the necessary lost motion. Finally, the two push buttons 151 and 152 may be replaced with a single push button operable with two different strokes, to control the partial and the total emptying of the cistern 5.

Claims

1. A control device for the water discharge valve of a cistern (5) for sanitary apparatus, including a closure element (31) for the said valve (31, 32) carried by a first float (29, 33), a member (82) operable with a predetermined stroke to raise the said first float (29, 33), and a second float (41) concentric with the said first float (29, 33) and having a hydrostatic thrust greater than the weight of the said float (29,

33), the said second float (41) being normally held against rising so that it does not affect the downward motion of the said first float (29, 33), for controlling a partial emptying of the said cistern (5), and being released to slow down the descent of the said first float (29, 33), thus controlling the total emptying of the said cistern (5), characterised in that a hook (59) normally holds the said second float (41) in place and is operable by the said element (82) upon performing an extra stroke beyond the said predetermined stroke so as to release the said second float (41).

2. A device according to Claim 1, in which the said first float (29, 33) includes an outflow discharge tube (29), the said second float (41) being axially movable in an annular space (23) of a support (19) along which the said discharge tube (29) is guided, characterised in that the said space (23) has an outer wall (21) having a hole (24) for slowing down the emptying of the water from the said space (23).

3. A device according to Claim 2, in which the said second float (41) has a portion (42) extending upwards beyond the said space (23), characterised in that the said hook (59) acts on an edge of the said portion (42) and is operated by the said member (82) by means of intermediate means (39, 63, 66, 79, 102, 129) comprising a lever (63) hinged to the said hook (59), the said lever (63) and the said hook (59) being pivoted on the said support (19).

4. A device according to Claim 3, characterised in that a connector (67, 68) which enables a lost motion stroke of the said lever (63) is located between the said lever (63) and a slide (66) operated by the said member (82).

5. A device according to Claim 4, characterised in that the said connector (67, 68) includes a peg (67) carried on the said lever (63), and a slot (68) located on the said slide (66) and in engagement with the said peg (67).

6. A device according to any of claims from 3 to 5, characterised in that the said lever (63) is formed from a pair of arcuate, symmetrical portions (64) surrounding the said discharge tube (29), the said arcuate portions (64) being connected by a bar (62) in engagement with a fork (61) carried by the said hook (59), the said peg (67) being radially located in a position diametrically opposite to that of the said bar (62).

7. A device according to Claim 6, characterised in that the said intermediate means (39, 63, 66, 79, 102, 129) include a connecting rod (39) releasably connected to the said slide (66), the said connecting rod (39) being operated by the said member (82) via a lever (79), the said connecting rod (39) being hinged in an adjustable position to the said lever (79).

8. A device according to any of claims from 3 to 7, in which the said member (82) is adjustably connected to a first sleeve (102) mounted on a cup-like connector (81) fixed onto a hole (87) in a cover (88) of the cistern (5), the said valve (31, 32) being fixed in a hole (7) in a base wall (6) of the cistern (5) characterised in that the said intermediate means (39, 63, 66, 79, 102, 129) include a flange (129) on which the said first sleeve (102) acts.

9. A device according to Claim 8, characterised in that the said flange (129) is carried on a hollow body (114) concentric with the said discharge tube (29), the said first sleeve (102) being carried by means (91, 92) slidable in a diametral guide (93) attached to the said hollow body (114).

10. A device according to Claim 9, characterised in that the said slidable means (91, 92) include a second sleeve (91), the said connector (81) being fixed to a threaded shank (83) which engages a thread (89) of the said second sleeve (91).

11. A device according to Claim 10, characterised in that the said first sleeve (102) is coaxial with the said second sleeve (91) and is axially slidable with respect thereto.

12. A device according to Claim 11, characterised in that the said first sleeve (102) has two wings (101), each having an axial slot (100) in which a corresponding radial element (99) of the said second sleeve (91) engages.

13. A device according to Claim 12, characterised in that the said first sleeve (102) includes a threaded portion (103) engaged by a threaded portion (108) of the said member (82).

14. A device according to any of claims from 8 to 13, characterised in that the said member is a push rod (82) operated by a pair of coaxial, hollow shanks (157, 158), each of the said hollow shanks (157, 158) carrying a corresponding push button (151, 152) and which makes the said push rod (82) follow a corresponding stroke, each of the said hollow shanks (157, 158) being held in the said connector (81) by a corresponding elastic element (161, 162).

15. A device according to Claim 14, characterised in that a first hollow shank (157) of the said pair acts on the said push rod (82) via a peg snap-engageable within the said first hollow shank (157), the said

peg (167) having a projection (168) coupled with the corresponding elastic element (161).

16. A device according to Claim 15, characterised in that the other hollow shank (158) of the said pair is outside the said first hollow shank (157) and has another projection (169) coupled to the corresponding elastic element (162), the said second hollow shank (158) having a cut out position (171) to enable the said stroke to be greater than the said first hollow shank (157).

17. A device according to any of claims from 14 to 16, characterised in that the said connector (81) is attached to the said threaded shank (83) and houses the said push buttons (151, 152), the said elastic elements (161, 162) being obtained by means of diametrically opposed slots (163) in an end of the said threaded shank (83) adjacent to the said connector (81).

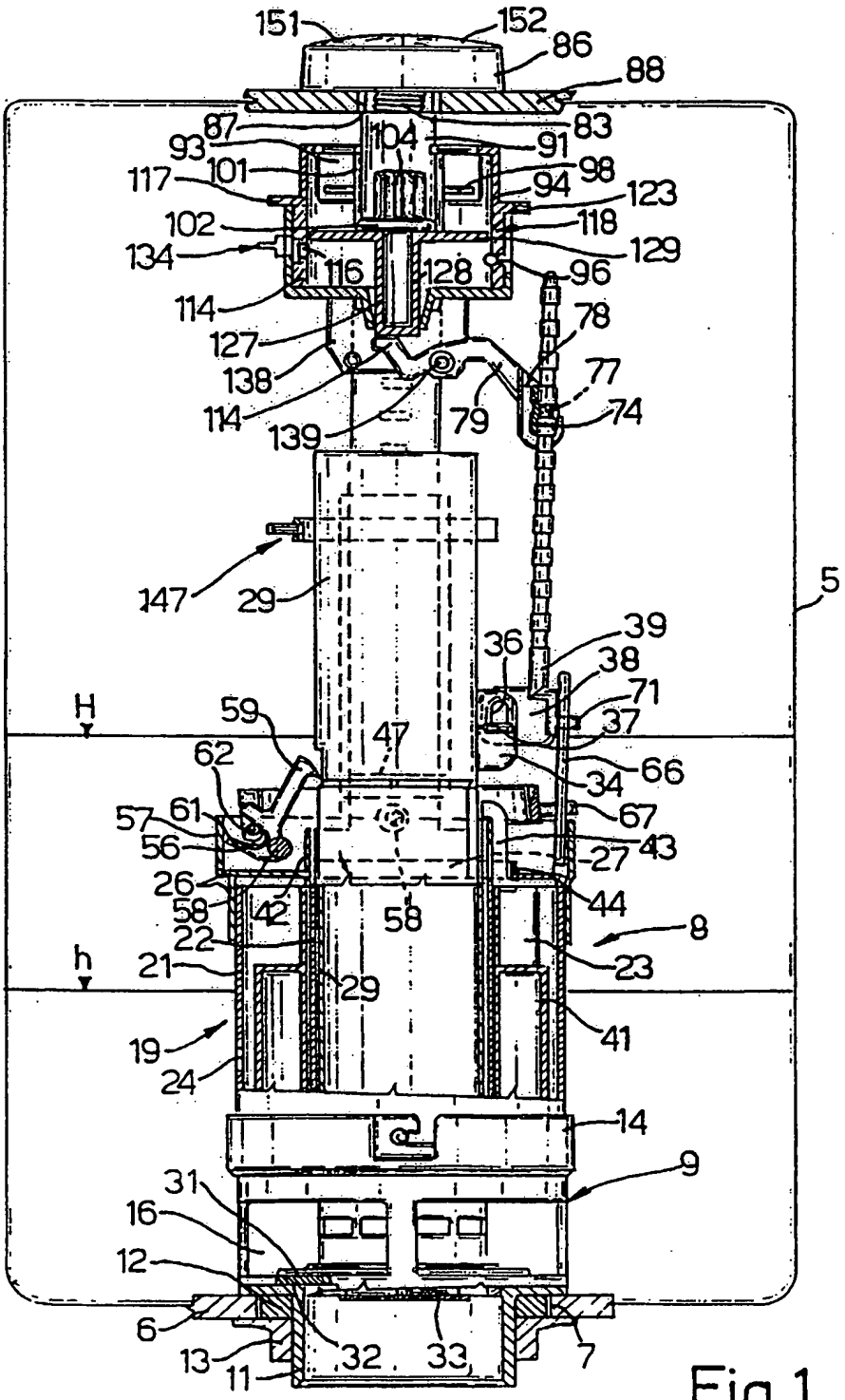
151
152
86
88
87
104
83
93
91
117
101
98
94
123
102
118
134
116
128
129
96
114
78
127
77
138
79
74
114
139
147
29
5
36
39
38
71
H
59
47
37
62
66
34
57
61
67
56
27
43
26
58
42
58
44
22
8
h
21
29
23
19
41
24
14
9
31
16
12
6
32
33
7
13
11

Fig.1

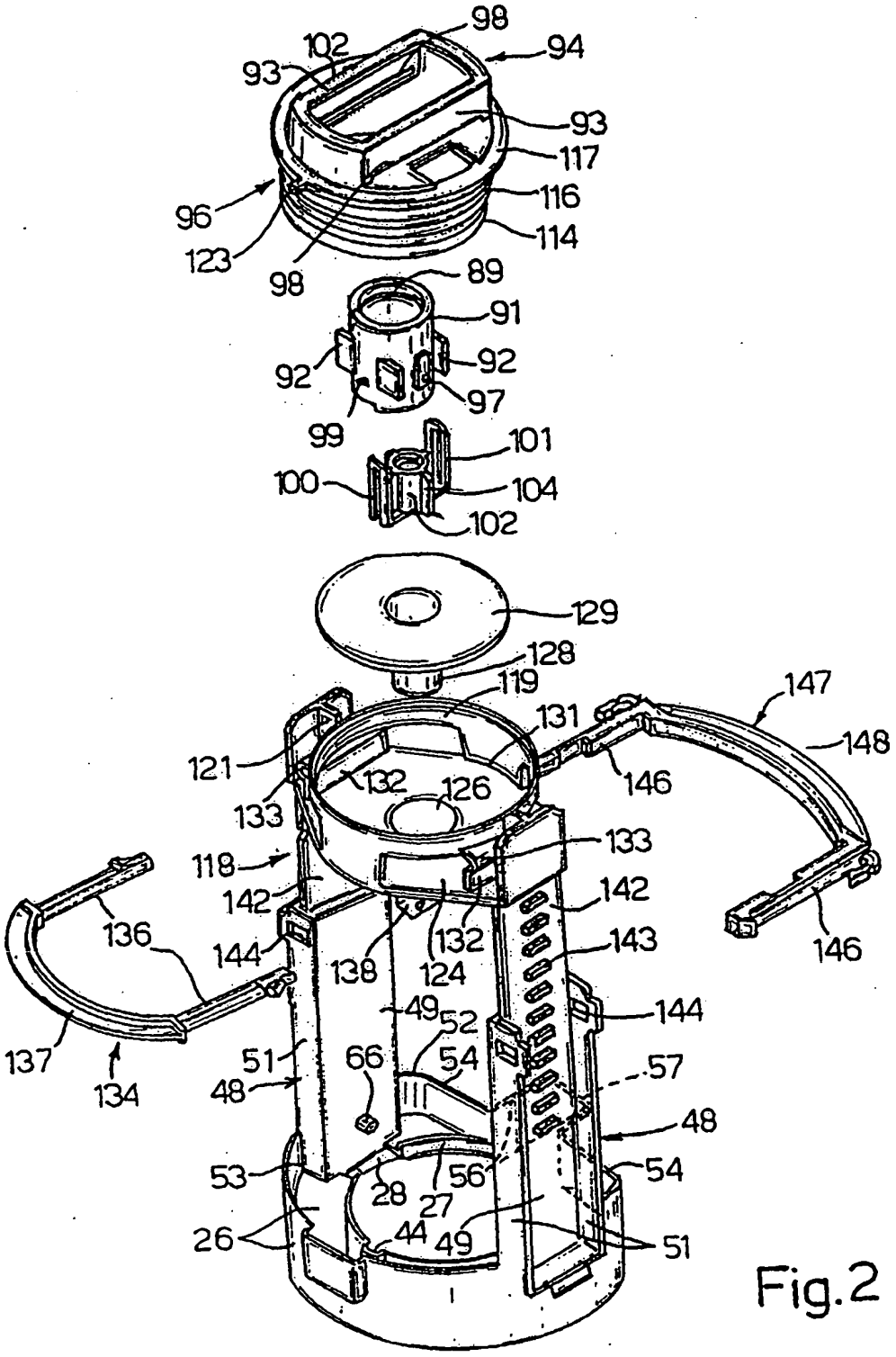
98
102
94
93
93
117
116
114
96
123
98
89
91
92
92
97
99
101
100
104
102
129
128
119
147
131
148
121
132
126
146
133
133
118
142
142
136
144
132
143
146
138
124
49
52
144
137
51
66
54
57
134
48
48
53
56
54
28
27
26
44
49
51

Fig.2

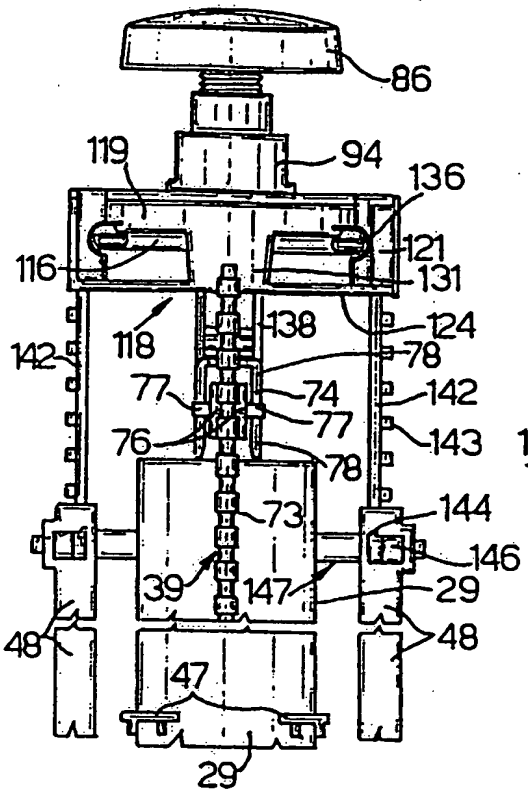

Fig.3

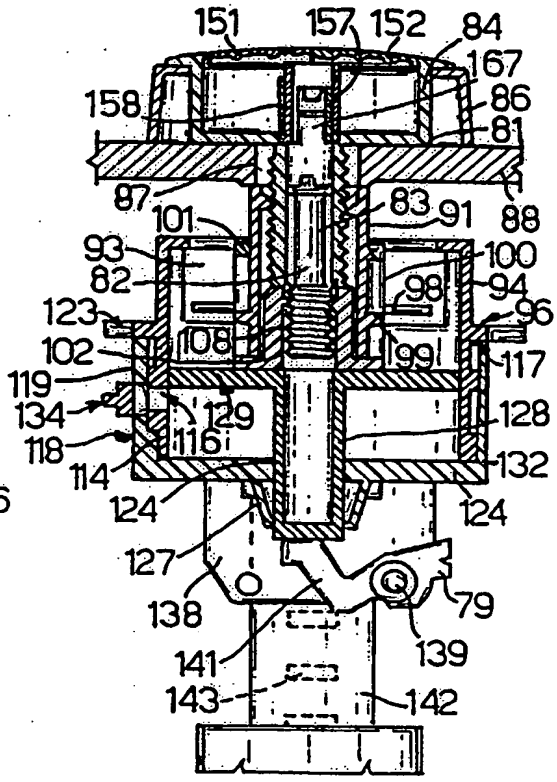

Fig.4

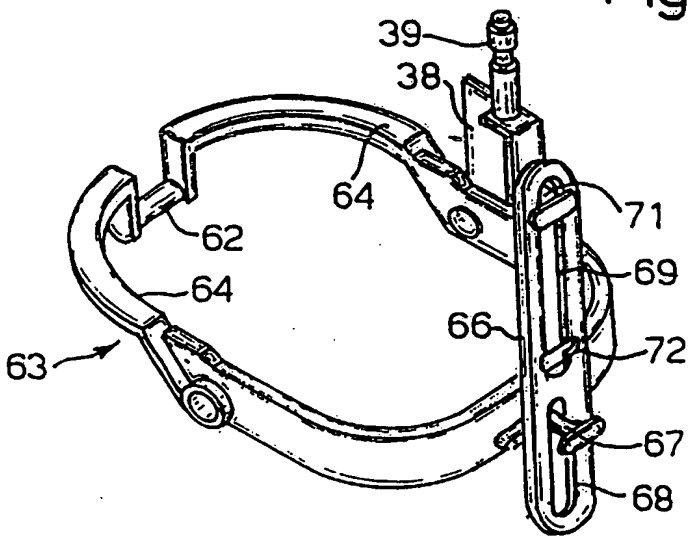

Fig.5

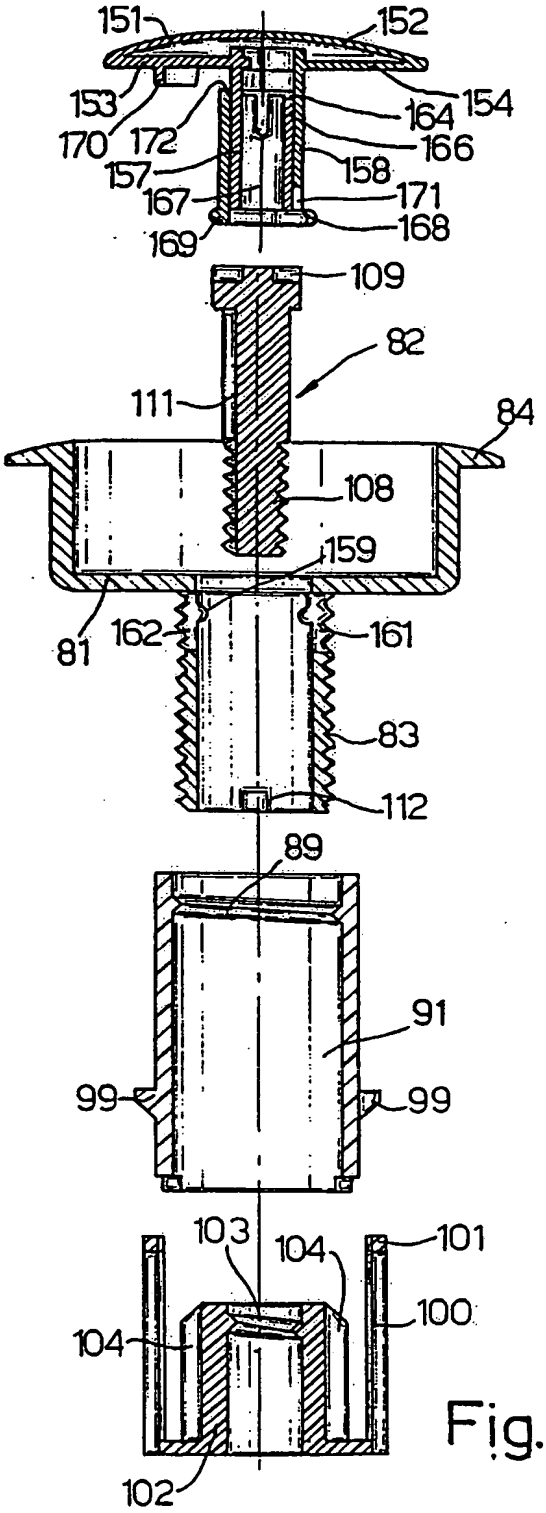
151
152
153
154
164
170
172
166
157
158
167
171
169
168
109
82
111
84
108
159
81
162
161
83
112
89
91
99
99
103
104
101
100
104
102

Fig.6

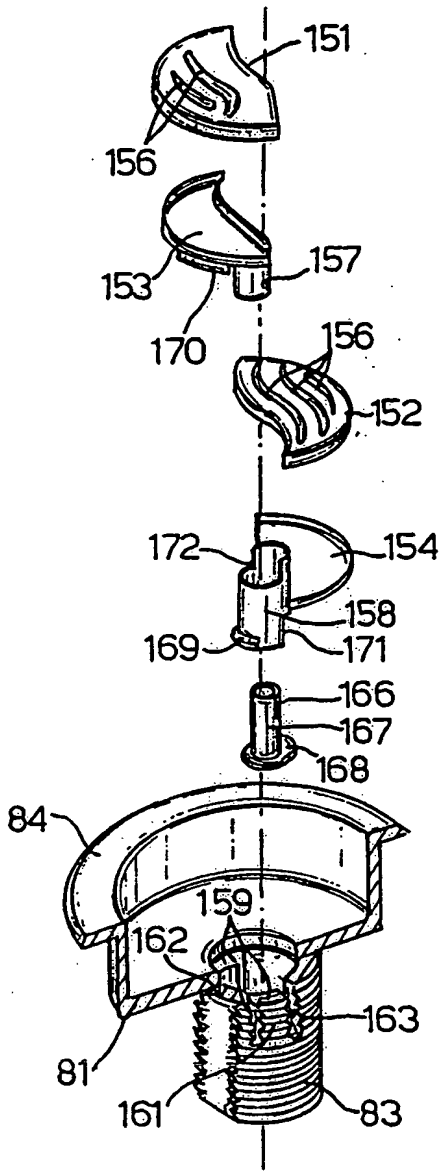
151
156
153
157
170
156
152
172
154
158
169
171
166
167
168
84
159
162
163
81
161
83

Fig.7

AU9176442

(12) PATENT ABRIDGMENT (11) Document No. AU-A-76442/91
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 638573

(54) Title
DUAL FLUSHING MECHANISM AND FLUSHING MECHANISM SUPPORT PLATE

(51)[5] International Patent Classification(s)
E03D 001/14

(21) Application No. : 76442/91 (22) Application Date : 09.05.91

(30) Priority Data

(31) Number	(32) Date	(33) Country
234333	02.07.90	NZ NEW ZEALAND
233623	09.05.90	NZ NEW ZEALAND

(43) Publication Date : 14.11.91

(44) Publication Date of Accepted Application : 01.07.93

(71) Applicant(s)
DUX ENGINEERS LIMITED

(72) Inventor(s)
ROSS ERNEST CHRISTIE; LYNDSEY HERBERT BROWN

(74) Attorney or Agent
CARTER SMITH & BEADLE , Qantas House, 2 Railway Parade, CAMBERWELL VIC 3124

(57) Claim

1. A dual flushing mechanism for a toilet cistern comprising:

a valve means adapted to control the passage of a fluid therethrough, including a tube which when lifted opens the valve means;

a bell supported on said tube; and

a release means for selectively allowing air into the bell, wherein for a part flush the release means is not operative so that the lowering fluid in the cistern draws the bell down by suction to effect premature closure of the valve means due to downward force exerted on the tube by the bell, and wherein for a full flush the release means is operative to allow air into the bell to prevent a vacuum forming in the bell and so prevent premature closure.

638573

P/00/001
Section 29

AUSTRALIA
Patents Act 1990

PATENT REQUEST : STANDARD PATENT

We, being the person(s) identified below as the Applicant, request the grant of a patent to the person identified below as the Nominated Person, for an invention described in the accompanying standard complete specification.

Applicant: DUX ENGINEERS LIMITED
Address: 6-8 Laery Street, Lower Hutt, New Zealand.

Nominated Person: As above
Address: As above

Invention Title: DUAL FLUSHING MECHANISM AND FLUSHING MECHANISM SUPPORT PLATE

Name of Actual Inventor/s: Ross Ernest CHRISTIE and Lyndsey Herbert BROWN

Address for service in Australia: SMITH SHELSTON BEADLE
207 Riversdale Road
Hawthorn Victoria 3122
Australia
Attorney Code SA

BASIC CONVENTION APPLICATION DETAILS

Application Number: 234333
Country: New Zealand
Code: NZ
Date of Application: 2nd July, 1990

Application Number: 233623
Country: New Zealand
Code: NZ
Date of Application: 9th May, 1990

Dated this 9th day of May, 1991

SMITH SHELSTON BEADLE
Patent Attorneys for the Applicant

Our Ref: #7093 PS:WB 31dux

M 026882 9-0591